

7. Story of the development of geometry including indirect measurement.<sup>1</sup>
8. Use of home-made instruments for measuring, such as transit level, hypsometer, proportional compasses, adding machine.
9. Story of algebraic symbolism.<sup>2</sup>
10. Evaluation of formulas. Example: The destructive power of an automobile is given by the formula  $K = WV^2$ , where  $W$  = weight of car and  $V$  = speed of car.  
 Let  $W = 3000$  lbs.  $V = 30$  miles per hour  
                                    $V = 60$  miles per hour  
                                    $V = 90$  miles per hour

Note that in doubling the speed the destructive power is four times as great, and that trebling the speed makes the destructive power of the car nine times as great.

11. Review and extension of concepts of formula, equation, similar terms, ratio and proportion.  
 Example: The distance a car will run after the brakes are applied is proportional to the square of the velocity, or as expressed in a formula  $D = .07V^2$ , where  $D$  = distance in feet, and  $V$  = miles per hour. Plot this equation on graphical paper.
12. Develop concepts of low powers ( $a^2, a^3$ ), positive and negative numbers as found in current magazines.
13. Fundamental skills, techniques and principles for dealing with the equation and the formula:
  - a. Four fundamental operations involving positive and negative numbers, using numerals and letters to represent numbers.
  - b. Squaring a binomial:  $(a + b)^2$ ;  $(a + b)(a - b)$ ; etc.
  - c. Equations with simple algebraic fractions:  $\frac{x + 2}{3} = 7$ , etc.
14. Establishment of relationships between table, formula, equation, and graph. See examples in 10 and 11 above.
15. Solution of first degree equations involving one unknown quantity using the following axioms: If equals are divided by equals the quotients are equal; if equals are multiplied by

<sup>1</sup>See History of Mathematics by Sanford.

<sup>2</sup>See History of Mathematical Notation, Vol. 1 by Cajori.